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York Factory's Octagon
A Multifaceted CRM Challenge

York Factory Depot. The three story section in the centre was constructed in 1831. The sections on each side were constructed in the following two years. Photo by S. Biron Ebell.

In Canada, management of federal buildings that have been designated as heritage properties, are regulated under the Canadian Federal Heritage Buildings Policy. As well, the new Parks Canada Cultural Resource Management (CRM) Policy (1994) provides guidelines for protecting and presenting all forms of cultural heritage resources, including sub-surface remains. A dilemma can arise when restoring a designated heritage building impacts significant archaeological resources. This predicament became a reality at York Factory National Historic Site in northeastern Manitoba. There, the challenge was to comply with Canadian Federal Heritage Buildings Policy conservation requirements while still preserving and protecting archaeological resources.

The most visible and spectacular aspect of York Factory National Historic Site is the over 150-year-old Hudson's Bay Company warehouse and packing room, called the Depot. This building, imposing in its scale even when constructed, became the central focus of the entrepot's activities over time, consolidating almost all of them under one roof.

Both time and the environment have left their marks on the Depot. As part of a large trading centre, today it stands alone on unconsolidated, saturated, permanently frozen river silts on the left bank of the Hayes River, about 8 km from Hudson Bay in Manitoba. Its proximity to Hudson Bay assures that winters are long and cold, and the summers short and wet. The Depot is large, measuring about 30 metres square, with an internal courtyard measuring 11 by 16 metres. This wooden frame building was constructed in sections over a seven-year period beginning in 1831.

By the 1990s the ground floor had severely deteriorated, being displaced vertically by permafrost and completely worn through in some areas. The building itself has sunk in the saturated soil and as a result of the vertical displacement, some floor boards were broken off where they were trapped under the building. When the flooring was removed, the substructure—consisting of heavy, square timber floor joists, sleepers, and mud sills—was found to be rotten and no longer provided necessary structural support.

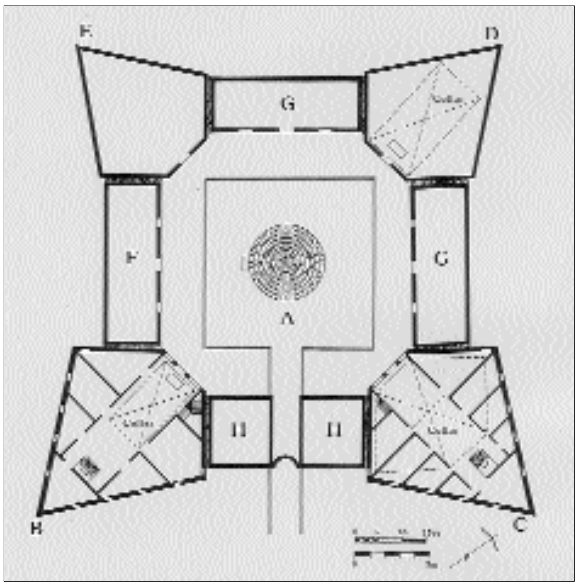
A series of monitoring and assessment studies over the 1970s and 1980s, revealed that the environment reacted with the building in complex ways. Successful, long-term stabilization of the Depot required addressing how the environment impacted the building and vice versa. The ground under the Depot is water logged. Depending on the season, all footings, floor substructures and pillars are either saturated or frozen, thus accelerating substructural deterioration. Further, the building had been constructed without eaves troughs. Rainwater leaving the building's roof pooled under the floor, adding to the natural moisture problem. Apparently this was anticipated in the original building design. Archaeological work revealed that box drains were initially installed, connecting the courtyard to exterior drainage ditches. Since the building was closed by the Hudson's Bay Company in 1957, they had not been maintained and were found filled with silt.

The effects of frost heave were devastating. It caused the ground to shift in response to temperature differentials created by the changing seasons and the insulating effect of the building itself. As a result, the ground floor was displaced vertically as much as 30 cm inside the building envelope. Displacement was so pronounced that, at one time it was believed that the floor was designed purposely to "float" inside the Depot walls. In truth, the building envelope and floor sat upon the same mud sills. However, the floor was displaced with such force that the mud sills were severely distorted or broken away from the building structure.

All of this was analyzed and identified during the site's Management Planning program conducted in the mid-1980s, where it was decided that a long-term Depot conservation and management strategy needed to be developed by Parks Canada. Part of that strategy included structural stabilization and repair which was implemented in 1992. This was necessary to assure the Depot's longevity and to make it safe for the public.

A small excavation under the Depot floor in 1982 indicated that remains of an earlier structure existed there (Adams 1985:150-154). At that time, these remains were not considered to be in any danger if the Depot floor were replaced using structural methods similar to those employed in

the past. The planning team, including an archaeologist, historian, heritage structures engineer and site operational staff, agreed on a methodology. The decision was to simply remove the old floor and substructure, excavate to a depth that would permit the floor to be reinstalled at its original level relative to the building envelope, then reinstall it; excavate drainage and insulation trenches and install them; and then redo the landscape. This work was premised on a belief that the earlier structure's remains were very fragmentary and that the eventual engineering solution would not seriously impact them.



Joseph Colen, the Hudson's Bay Company "resident officer" created this plan for a "Commodious Fort...at York Factory..." in 1786. Shown here are structural details of the Octagon, the fortress-like structure that housed the company officers and men and also served as a warehouse. Redrawn by D. Elrick.

With these parameters in mind, the floor was removed by archaeologists in 1991, and the fill excavated between the floor joists. What they found under the floor were well-preserved remains of the "Old Octagon," a fortress-like building constructed by the Hudson's Bay Company between 1788 and 1795 [Ebell and Priess 1993]. Remains of this structure were often found above the bottom of the Depot building envelope. In the following two years, additional remains were found when the floor was completely removed and insulation and drainage trenches were excavated outside the Depot walls and in the courtyard. In almost every incident, remains of the "Old Octagon" impinged on the planned floor reinstallation. Therein lay a serious heritage dilemma, pitting preservation of the standing Depot building against the buried structural remains of the "Old Octagon."

The York Factory Octagon was patterned after 18th-century European military fortifications. It consisted of five-sided, two-storey flankers or bastions located at each corner, interconnected by four enclosed rectangular structures called curtain sheds. The whole structure enclosed a roughly octagonal courtyard. Sometime after its completion, a "men's cook room" was attached to the exterior of the south west curtain.

By 1831, after only 35 years of service as a warehouse, and officer's and men's quarters, the Octagon had to be replaced. Its weakness lay in the rigidity of its solid wooden and brick walls. Such structural technology may have been appropriate for the British climate, but it did not permit the Octagon to flex with the heave and pressure of northern Canadian permafrost. Thus, the foundations and the structural envelope deteriorated quickly.

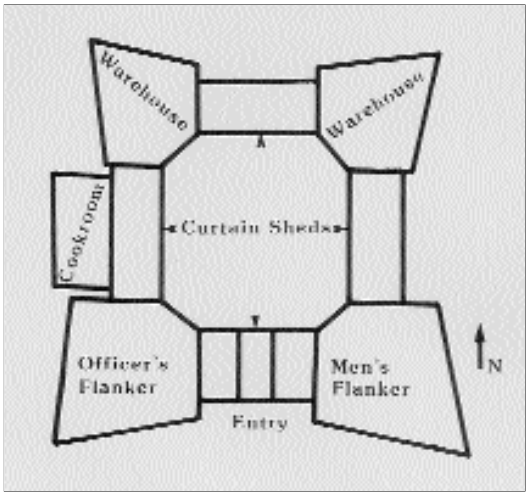
The Octagon was demolished and replaced, section by section, over an eight-year period. By 1838 the Octagon was gone and the Depot stood in its place, looking much as it does today. Even though the Octagon was demolished over a century and a half ago, and its remains have been impacted by Depot construction and numerous subsequent repairs as well as relentless frost-heave, archaeologists found its remains remarkably well preserved. These include four flanker cellars (two of which were open and filled with water), footing remnants of all flankers and curtains, a fireplace or chimney foundation, footings and possible oven from the cook room, and a thick refuse deposit encircling the Octagon exterior. In one of the many ironies of this project, the very environmental features—the cold, waterlogged ground, permafrost and poor drainage—that were destroying the integrity of the Depot, were working to protect the Octagon remains. These conditions also served to protect highly vulnerable artifacts such as organic fabrics, clothes and tools; delicate associations such as bead patterns; and a myriad of important scientific remains: bone, seeds, plant remains, even hair and skin.

Depot restoration required achieving three interdependent objectives. The first concern was to reinstall the floor and footings. This was deemed necessary to continue to permit use of the building by the public. To protect this new flooring, a drainage system was re-established to prevent water accumulating under the floor. Finally, the ground had to be stabilized to prevent both the building and the floor from moving. The dilemma arose in 1992 when the extent of the modification to the structure and the surrounding environment threatened to impinge on the recently discovered remains of the Octagon.

In the initial plans to stabilize the ground under the building, permafrost engineers had recommended installing insulation in shallow trenches excavated next to the exterior walls, around the courtyard, and under the entirety of the new floor. This would allow the ground to freeze under and around the building creating a solid permafrost platform for it. Similar techniques are used in other permafrost regions of the world to create stable building surfaces. For this to succeed, they also created a drainage system to prevent water from accumulating under the floor to prevent frost heaving. This assured that the new

footings will last. These solutions required significant modifications to the extant ground surface both inside and outside the Depot.

As defined by the *Parks Canada Guiding Principles and Operational Policies* (1994:78) both the extant Depot structure and the "Old Octagon" remains are nationally significant cultural resources. The management planning program had not anticipated that there could be a conflict between cultural resources and no guidelines had been set in place against this eventuality. Initially, it seemed that successful Depot restoration would impact the Octagon remains to an unacceptable degree under the new policy. Both structural engineers and archaeologists were convinced that the cultural resources under their care were of national significance and required primacy in any intervention. In reality, both resources were of equal significance and each required its own set of protection and presentation measures. It was fundamental to any solution that plans to meet the objectives of the engineers in a context that was acceptable to the archaeologists would include input from several disparate disciplines, including permafrost engineering, landscape architecture, structural engineering, ecology, and archaeology. It also fell to Parks Canada managers to develop a team approach since various heritage interests were lining up on one side or the other.



A detail from an anonymous drawing of York Factory dated 1815.Note the cook room added to the exterior wall of the west curtain shed. Footings and possible oven remains from this cook room were uncovered by archaeologists in 1992. Redrawn by D. Elrick.

A number of specific problems had to be addressed. Of major concern was the heritage significance conflict between the Octagon remains and the Depot. Depot structural integrity and occupant safety had to be achieved without seriously impacting the buried Octagon remains. At the same time, construction impacts on the Depot's complex environmental integrity had to be anticipated and mitigated. How, then, could Depot restoration be accomplished without significant impacts to the Octagon remains? As a result of cooperation in the field between archaeologists and restoration technicians, modifications were made to the restoration design that did not significantly compromise either the Depot or the Octagon.

The two open cellars were pumped out, lined with geotextile—a water permeable fabric—then filled with soil. This will preserve the wooden cribbing, reduce the moisture trapped under the new floor, and provide future archaeologists with a stratigraphic reference point between 19th- and 20th-century cellar fill. Restoration technicians inlaid insulation around the Octagon footing remains that were exposed in the insulation trenches outside the Depot and in the courtyard. These features experienced almost negligible disturbance while at the same time achieving required insulation levels.

The floor substructure was redesigned to bridge large sections of *in situ* Octagon remains. However, Depot floor installation did not occur without some impacts to Octagon remains, and it was sometimes necessary to negotiate changes in floor design to assure that important Octagon features such as structural corners were preserved. Special floors of reduced thickness and structural strength were installed in some cases so thick artifact deposits and Octagon remains would not be disturbed. But, to assure the Depot's continuing structural soundness, deep trenches were required in strategic areas, both for support and drainage. In one instance, a footing had to be installed that impacted Octagon cellar remains and cross timbers. Unfortunately there was no room for negotiation in this case. Without this footing, the Depot could not be restored to structural soundness. The only alternative was to record the *in situ* remains and the subsequent disturbance.

Unfortunately, impacts to the artifact refuse deposits were not so easily mitigated. The artifacts were usually found in a single stratigraphic layer. The insulation trenches completely encircling the Depot had to penetrate into (but not through) these deposits. A small back hoe was used in the excavation and, of course, random testing by archaeologists failed in almost every instance to predict the location of significant artifact deposits. As a result, when artifact concentrations were encountered, hand excavation had to be done quickly, usually just ahead of the machine. In spite of the rush, three fragments of intact bead work were recovered, as well as a bear claw necklace, clothing remnants, a felt hat, three human molars (containing large caries), and other fragile artifacts too numerous to mention.

In one area of heavy artifact concentration, a special recovery program was implemented. To assure that artifacts were not lost and received appropriate protection, the artifact layer was carefully stripped away using shovels and stockpiled by horizontal provenience. Later, artifacts were recovered from the stockpile while the restoration crew carried on with their insulation installation and landscaping.

As an aside, the artifact-rich organic layer contains garbage discarded around the walls of the

Octagon: probably much of it thrown from the windows. A layer of sand covering the deposit in some areas, suggests that an attempt was made to reduce the odour of decaying organic wastes. This speaks of what was acceptable sanitary conditions at the time!

The restoration of the Depot at York Factory was achieved and all of the engineering objectives were met. In the process, from design to finished product, the actual foundations and environmental systems were modified or redesigned to protect the subsurface remains of the Octagon in as many places as possible. *In situ* artifacts did not fare as well but concessions were made by all involved personnel to remove artifacts in as scientific a manner as possible within the constricted time frames. This was accomplished primarily as a result of learning that the new policy expects Parks Canada to respect all cultural resources equally. Through the evolution of the project a necessary sense of co-operation and teamwork was built between archaeologists and restoration workers in the field, to solve mutual CRM concerns.

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Tales that Privies Tell

Excavating the latrine at Fort Wellington.

Excavating an old latrine may not sound like much fun but it can provide a great deal of information concerning the lives of the people who used it. This is especially true when the recovered material is carefully analyzed and interpreted, something that many researchers do not undertake either because of tight timetables or a lack of the required knowledge. Fortunately, in the case of Fort Wellington, a 19th-century British fort in the city of Prescott, Ontario, a thorough interdisciplinary study was possible. The resultant knowledge significantly altered existing perceptions of life at the fort and led to the revision of the interpretation program at the site. Fort Wellington was established overlooking the St. Lawrence River during the War of 1812 to ensure that the vital transportation route linking Montréal and Kingston remained open. The fort was abandoned in 1826, but reoccupied in 1839 in response to the Rebellion of Upper Canada. A number of alterations were made at this time, including the construction of a three-storey blockhouse and a latrine. The fort was garrisoned by battalions of various regiments over the years, as well as several militia units. The elite Royal Canadian Rifle Regiment (RCRR) inhabited the fort from 1843 to 1854.

A stabilization program was conducted at the fort from 1990 to 1992. This was accompanied by investigations undertaken by archaeology staff from the Ontario Regional Office of Parks Canada in Cornwall, Ontario, under the direction of Joe Last. The work included the investigation of the gate entrance, the west palisade curtain wall and the latrine.

While much useful information was obtained from all the excavations, most of it came from the fill of the garrison privy. This unique structure—the only extant wood-framed military latrine of its age in Canada—consists of a hipped-roofed structure divided into three rooms. The southern-most room was for the enlisted men. It lacked seats, so the men perched precariously above a bench along the east wall using hand holds. Women used the central room which had a two-seater arrangement,